gives descriptions, with bibliography and in some cases figures, of 15 species. PANTANELLI[28] gives a lengthy description of a mite (*Eriophyes*) of the olive and also a description of its gall. RUBSAAMEN,[29] continuing his studies on the European cecidia, describes, and in many cases figures, 42 species, 4 of which are new. BAYER[30] in a paper on the cecidia of Bohemia gives a bibliography of 32 titles and lists 198 cecidia.

For a number of years the anatomy or rather the histology of cecidia has proved an interesting field for the European workers, but only in recent years has it attracted the attention of the American students. A recent paper is that of GREVILLIUS[31] on the anatomy of the thysanopterous cecidia of *Vicia Cracca*. This gall is very conspicuous because of the curling and twisting of the leaves which are infested with the insects, whose eggs can be found between the epidermis and mesophyll. In the more advanced stages the palisade cells lose their characteristic forms and become isodiametric. These galls never develop the complicated structures found in those produced by the hymenopterous insects.

Although the physiological problems connected with the study of insect galls have long been looked upon with interest, the difficulties have been so great that few have had the courage to attack them. One of the recent papers on this subject is by NALEPA,[32] who has taken up a study of the gall-inhabiting ants. This subject has been investigated by others, among them PEYRITSCH, who considered light the most important factor because there were more galls on plants growing under shade than in the light. NALEPA'S work took into consideration the relative importance of light, temperature, and moisture, and involved a number of experiments in which the insects were kept in cylinders, in which these factors could be controlled. In this connection he studied also other insects, such as *Eriophyes*, which he found were uninfluenced by the light. His results in general confirm the views of PEYRITSCH.—MEL T. COOK.

Transpiration.—RENNER[33] has published a paper on the physics of transpiration. It adds a number of important facts to the epoch-making work of BROWN and ESCOMBE on multiperforate septa. He works out mathematical formulae for the resistance to the passage of water vapor offered by stomatal apparatus of various xerophytes. The experimental part is carried out with models having the shape of xerophytic transpiratory canals and with plants

[28] PANTANELLI, E., Un Eriofide nuovo sull' olivo. *Op. cit.* 142–146.

[29] RUBSAAMEN, EU. H., Beiträge zur Kenntnis aussereuropäischer Zoocecidien. *l.c.* **9**:3–36. 1910.

[30] BAYER, EMILE, Les Zoocécidies de la Bohème. *Op. cit.* 63–104.

[31] GREVILLIUS, A. Y., Ein Thysanopterocecidium auf *Vicia Cracca* L. *Op. cit.* **8**:37–45. 1909.

[32] NALEPA, A., Der Heliotropismus der Gallmilben und seine biologische Bedeutung. *Op. cit.* 78–84.

[33] RENNER, O., Beiträge zur Physik der Transpiration. Flora **100**:451–547. 1910.

themselves. In agreement with BROWN and ESCOMBE, he states that loss of water vapor from leaves is through static diffusion, and that it is proportional to the differences of density of the vapor inside and outside the leaf. RENNER urges, as a thing of great importance, that the rate of diffusion will be inversely modified by an increase in the distance between the region of minimum density outside the leaf and the maximum density within the leaf. It is with methods by which this distance is modified that he is mainly interested. If the distance is great, the gradient is low and the flow is slow; if the distance is small, the gradient is high and the flow fast. One way in which this distance is increased in still air is by the water vapor cap which forms over the surface of the leaf. The larger the leaf, the greater the average thickness of the vapor cap. For this reason, in still air the amount of transpiration does not vary with the surface of the mature leaves, but is proportionally less for the larger leaves. RENNER believes that if the air were absolutely still it would vary as the diameter of the leaves.

Winds increase the transpiration of small mature leaves by a much greater percentage than it does the large ones. In wind the transpiration is proportional to the surface of the leaves. Again, the distance between the internal maximum vapor pressure and the external minimum may be increased by external or by substomatal cuticular cavities; if of the same size and shape, RENNER finds that the two have equal effects.

RENNER devised a means of experimentation by which he located the point of saturation within a rapidly transpiring leaf. He believes it often lies some distance from the stomata. In such cases a considerable system of intercellular spaces is involved in the diffusion. He emphasizes the fact that in such cases the stomata, if open, are only a small part of the diffusion canals, and therefore play a small part in the control of transpiration. In a similar way their importance as controlling factors is modified by internal and external cuticular chambers, and even by the vapor cap.—WILLIAM CROCKER.

Infection experiments with rusts.—In a preliminary report of some infection experiments made near Neuenburg (Switzerland), MÜHLENTHALER[34] shows that teleutospores of the *coronata* type of *Puccinia* from *Calamagrostis varia* produced aecidia on *Rhamnus alpina* and *R. Purshiana*. Aecidiospores from these reinfected *Calamagrostis varia* and *C. tenella* among several grasses tried. Aecidiospores collected on *R. cathartica* produced uredospores on *Bromus erectus* var. *condensatus*, *Festuca alpina*, *F. arundinacea*, *F. gigantea*, and *F. varia*. The uredospores thus produced on *Bromus erectus* var. *condensatus* could be transferred to *B. erectus* and its var. *condensatus*, *B. inermis*, *B. sterilis*, and *B. tectorum*.

In continuation of his cultural work on the Uredineae, ARTHUR[35] reports

[34] MÜHLENTHALER, F., Infektionsversuche mit Kronenrosten. Centralbl. Bakt. II. **26**:58. 1910.

[35] ARTHUR, J. C., Cultures of the Uredineae in 1909. Mycologia **2**:213–240. 1910.